

Simpkin

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SUPPLEMENT DESIGN
FOR A "GALLEON"
TEA TRAY

Hobbies

WEEKLY

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CHILDREN'S TWIN ROCKER

In families where there are two youngsters, the twin rocker illustrated would prove a welcome present. Both kiddies could use it at once, and keep themselves amused and employed without trouble to the rest of the family. The article can be easily made, and requires only a length of deal board.

Board of 1in. thickness and 9ins. in width is recommended, as a substantial article is desirable. A length of 8ft. 2ins. is required and so, despite the appearance of the rocker which rather creates the impression that a lot of wood is needed the actual amount is comparatively small.

Side Shapes

To get out the sides, cut off two 3ft. lengths of the wood. A pattern is given in Fig. 1. This is divided into rectangles of 1in. by 3ins. as a guide to copying the shape. It is not absolutely essential to draw the whole length, one half could serve. Divide this into the rectangle on stiff cartridge paper, then, with the aid of the pattern, draw the half outline.

If the curves can be struck with a compass, one of the beam pattern, then the whole drawing would be bet-

ter to copy. The end curves are part of 4in. circles, and here an ordinary compass would suffice.

Cross Joints

Note the position of the mortises into which the seat boards and bottom foot board, fit. Those at the top are 1in. long, and the part at the bottom 1in. longer also, and separated by 2ins. The pattern should be cut out with scissors, then pinned down to the wood and a pencil drawn round the outline to mark it on the side.

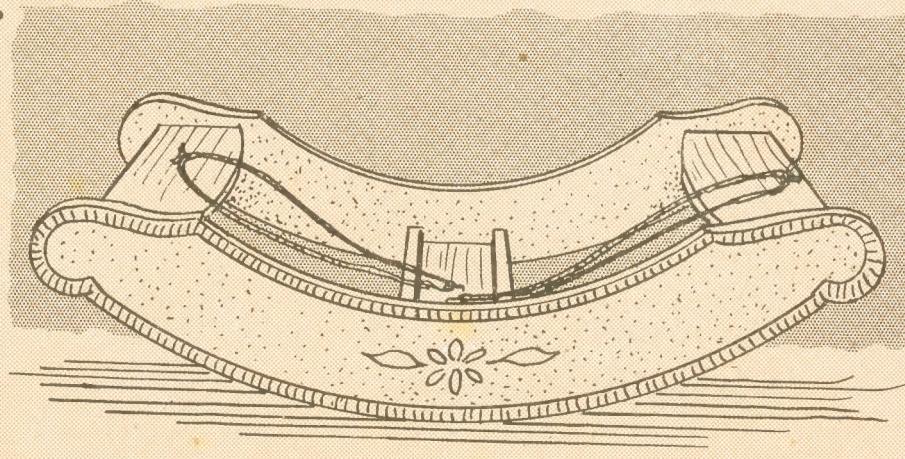
The exact position of the mortises

can best be marked by pin prickings them at each corner, and joining up the marks when the pattern is removed, with pencil lines, checking them for accuracy. It may be mentioned here that if planed board is bought, its exact thickness will, most probably, be $\frac{1}{2}$ in., not the full 1in. a point to remember when marking out the mortises.

Cleaning and Shaping

The shapes can be best cut out with a bow saw, but failing such a saw then the ever useful keyhole one can do the job. The piece cut out at the top should be carefully laid by, as from it one of the seat boards can be made. Smooth the curves all round, especially the bottom one on which the article will rock. Try and get a uniform curve—the true arc of a circle in fact, on this part.

Using the completed side as a template, pencil it on the second side part and cut that out. The mortises can be cut quite easily, if a 1in. hole is bored through first, and the remainder cleaned out with a sharp chisel.



The seat boards are shown at A, in Fig. 2. These utilise the full width of the cut out pieces from the top of the sides. The ends are trimmed to the length given, allowing for the 1in. tenons, of course. These are placed just 1in. from the outer edges of the boards. Make these tenons a close fit for their respective mortises. At B, a portion of the foot

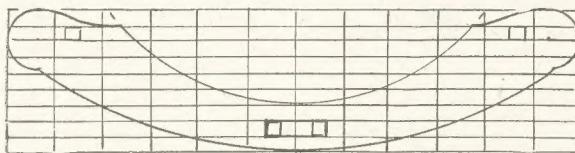


Fig. 1—Outline drawing of shape of main sides with mortises

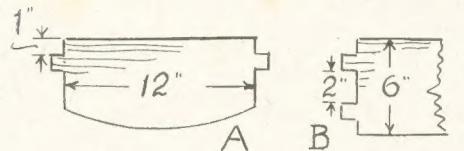


Fig. 2—The seat and foot boards

board is shown. Its length, exclusive of the tenons, is the same naturally as that of the seat boards. Here again take care to cut these tenons a good fit.

The seat and foot boards can be glued between the sides of the rocker, knocking the joints up tightly. It is important to strengthen the fixture of these boards by driving nails through the sides into the ends of the boards as shown in detail C, Fig. 3, for the seats, and D for the foot board. Screws would really be stronger here, as some strain

comes on the boards when the rocker is in action.

At each side of the footboard screw 1in. strips of the wood, as shown in Fig. 4. If the heels of the youngsters bear against these, while the soles of their shoes rest on the opposite strips, some grip is obtained to help with the rocking motion. Reins are added, which the children can hold and pull on while rocking. These impart confidence, and also act as a safety device. They can be made from a strong cord, or fine

rope, such as sash cord.

To hold these, in the centre of the footboard drive in a pair of strong iron staples, close together, allow sufficient cord for each rein, thread through the staples, (one rein to each staple) and then knot securely. Fig. 4 shows this matter, which should be quite plain.

The work of construction being completed, go over the woodwork with glasspaper and make all smooth, especially the edges, as no splinters must remain which would hurt young hands.

An article of this description, if it is really to look attractive, should be gaily painted. No colour is too gaudy for such a job. Give the work a preliminary coat if possible, of priming colour to fill the grain first and save paint. Over this a hard gloss coat of brilliant red or green paint would look well, or two coats of ordinary paint, the flat kind preferably, finishing off with a coat of clear varnish.

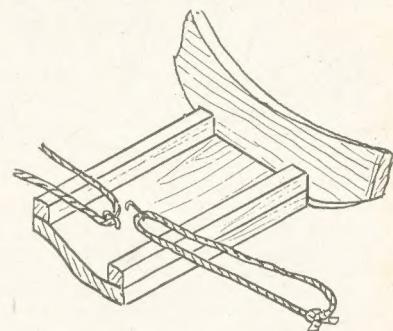


Fig. 4—Fixing the holding ropes

A little decoration carried out would prove an added attraction. For instance, a $\frac{1}{2}$ in. border of some contrasting colour would look nice, and if a simple floral device were added, as in the drawing of the finished rocker, which does not call for much artistic skill, a good finish would be assured.

An alternative would be to fix one of those attractive transfer decorations each side, such as are now made for children's furniture. Obtainable from most stationers' or furnishing stores.

What Paints to use on Models

If you have already a satisfactory method of painting your models, then do not try any new method; old and proven methods are the best. Experiments should be left to beginners or at any rate if you must try, then use an old model.

Preparation

This is the most important part of any painting job. For instance, if the surface to be painted is rough, then it would be foolish to expect the finished result to be smooth and even. Wood should be glasspapered to absolute smoothness; metal surfaces similarly treated with emery paper. Paper models require no special treatment.

French Oils

These are growing in popularity. The colours do not run, are water and damp proof, and do not raise the grain. Shades are readily mixed and dry semi-matt. Disadvantages are slow drying, and that some colours are costly. Drying may be accelerated by the addition of cellulose thinners.

The resulting compound is difficult to use due to over compensation. White spirit should be used as a thinner,

though sparingly, otherwise the drying time is inconvenient.

Water Paint

Probably the most useful of paints since it is easy of application and requires little preparation. Before painting wood the surface should be 'filled', using a solution of glue size—1 part, water 3 parts—and allowing to dry. If the paint tends to rub off, a little common salt in the water will prevent this.

Water Colours (Poster)

These are the most popular of paints, being readily obtained and drying an even matt. Tendency to rub off may be corrected as above. If a semi-matt finish is required, a brisk rub with a clean dry cloth will give a dull sheen which is ideal for hull finishes, etc. A slight drawback is a tendency to raise the grain.

Enamel (Oil)

This cannot be recommended for general model-making. It is only for large models of the toy and model engineering class that it can be used with advantage. However, it is excellent for covering large surfaces which can be

left to dry for long periods, since it shows no brush marks. Engineers should be careful in using it where heat is likely to occur, as it will blister.

Enamel (Synthetic)

Again as ideal paint for engineers, being easy to apply to large areas, withstanding heat without blistering or changing tint.

Enamel (Cellulose)

Dries very quickly and can be handled within fifteen minutes of completion. Is used widely by model aircraft enthusiasts, and commonly called 'dope'. Members of the fairer species call it nail varnish. It should always be used very thinly, the colour and body being obtained by three or four coats. Should it dry too quickly, one or two drops of castor oil—no more—should be mixed with, say, 6ozs. of 'dope'. More than this and failure to dry at all will be the result.

Before one coat of paint is applied to another always give a light glasspapering. In painting, an old piece of wood, practice and patience will show you more than any article. (210)

(Reproduced from the Sheffield Ship Model Society Book)

Enjoyment of a popular pastime obtained by making AN ARCHERY SET

TH E bow and arrow was, at one period of English history, the most terrible weapon of its time, and though we may laugh at it nowadays as a weapon of war, in olden times the archer made it one to be feared. All that is passed, and the bow and arrow merely a sport—but a jolly interesting one for all that. It is comparatively a cheap one too, as the accessories can be made at little cost and will last.

The bow is the most important, and for this a tough, springy piece of wood is essential. Ash is a good choice, also hickory, lancewood and greenheart. It will probably be a case of using ash, as undoubtedly this is the most easily obtainable now.

Suitable Length

A not-too-powerful bow is advisable for a beginner and a length of the wood chosen, 5ft. long, will about suit. Choose a straightforward strip and plane it to round section with a diameter of about 1 inch. This will be quite strong enough.

For a distance of 5ins. at the centre, the wood is left as it were, but from here to the ends it is shaved down to $\frac{1}{2}$ in. wide and $\frac{1}{8}$ in. thick at the ends. Do this tapering carefully and evenly, and note that the shape alters from a round at the middle to D-shape, as shown by the sections given in Fig. 1 across the bow.

An inch or so from the ends, notches for the cord to lie in are filed out the shape shown. The bow should now be bent as a test, and if one half bends more easily than the other, the tougher half should be scraped down until both are about equal. Now glasspaper to smoothness.

Strong Cord

For the cord, or string as it is more usually called, a tough whipcord can be used. Fold one end double and tie to form a loop, as shown in the diagram. Hitch this to the bow, bend the bow and tie the other end of the cord to it so that when taut the cord is distant from the centre of the bow about 5ins. Loosen the cord and make a second loop where the knot comes.

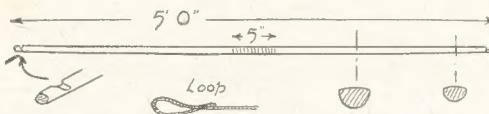


Fig. 1—Details of bow strip with section of shape

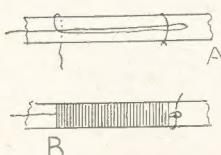


Fig. 2—Centre binding

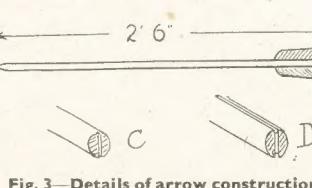


Fig. 3—Details of arrow construction

The centre of the bow should now be bound for 5ins. with a strong thread, just like the handle of a bat. To do this, neatly double 7ins. of the thread and lay along the bow, as at A, in Fig. 2. Tie a piece of thread round it to keep it there, then from the commencement of the space to be bound, wind the thread round and round until it covers the whole 5ins. length.

Cut off, and pass the end through the loop as at B, pull the commencing end, and the finishing end will disappear under the binding. Cut off any surplus, then varnish the bow and binding also. Finish the bow by tying a piece of coloured thread round the exact centre of the binding as a guide to placing the arrow.

Some lengths of $\frac{1}{2}$ in. round ash will be required for the arrows, several of which it is convenient to possess, to save much trotting up to the target to retrieve them. Cut to the length shown at Fig. 3, and sharpen one end to a bluntness point.

A good tip here is to char the end in a fire, or gas jet, as it hardens the wood and makes the point last longer. At the flight end, file a groove into which the cord can lie, as at C. From the ends of this groove and using a tenon saw, make saw kerfs about 4ins. long and $\frac{1}{8}$ in. deep to contain the feather flights, as at D.

The Feathers

Any feathers large enough for the purpose can be utilised. The old archers used to swear by the feathers of a goose, but that may have been just a sportsman'sfad. One half of each feather should be cut away to the rib, then be roughly trimmed to length and glued in the saw kerfs. When the glue is quite hard,

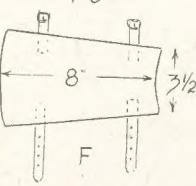
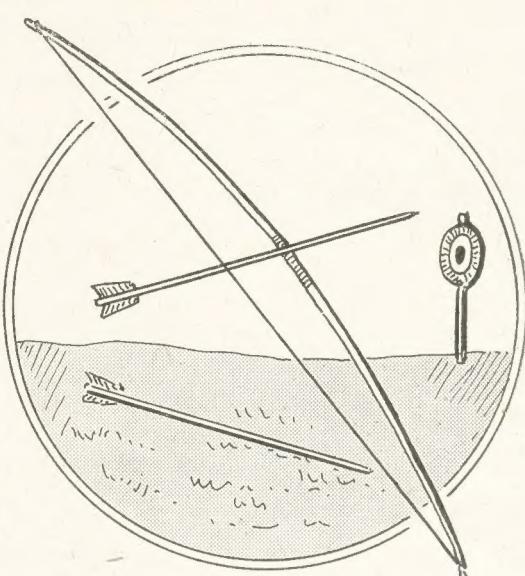


Fig. 4—A target and arm guard



and not before, trim the flights to shape.

The Target

Of course a target will be needed, and this is sketched at E in Fig. 4. Make a straw rope, say about $1\frac{1}{2}$ ins. diameter and when sufficient has been done wind it round and round, like a mat, tying it with string to keep all together and flat.

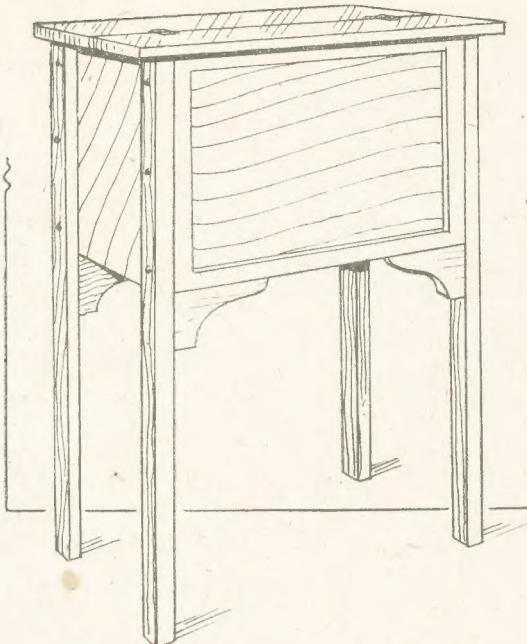
It could be covered with coarse canvas and be painted with concentric circles, red, white and blue, as a guide to the 'hits'. As the sport is generally held in a field, a sharp pointed post might well be used to hold the target up.

Bracer Guard

One accessory it is wise to make is a bracer guard, to bind round the inside of the forearm and save the skin from the possible flaying it may receive when the bow string springs forward. This can be made of stout canvas to the dimensions and shape shown at F, and be provided with tapes, or what is better still, straps and buckles, to hold it safe to the forearm. A quiver to hold the arrows might be included also. This is not illustrated, as it is merely a long bag, like a golfer's, and slung over the shoulder. Canvas would do for this also.

Using the bow, it is gripped with the fingers of the left-hand, at its centre, the arm being kept straight and stiff. The body is braced and the arrow should rest on the hollow between thumb and forefinger. The string is firmly gripped between the fingers, the arrow between thumb and forefinger, with the cord pressing against the notch as the string is drawn back.

Any housewife would be delighted with this TABLE VEGETABLE BOX



It is always a convenient matter to have some receptacle in which potatoes, onions and other vegetables for the household can be neatly stowed away. It helps to avoid untidiness in the kitchens, and what is of more importance, keeps mice away. The table box, illustrated, is a combined piece of kitchen furniture, it includes besides the very convenient little table, a handy box receptacle for the vegetables, with a hinged lid for easy access to them.

Despite its appearance, the article is of very simple construction, any handy woodworker can make it, and the quantity of wood required is surprisingly small, as a grocer's box is suggested for the vegetable receptacle.

Timber Required

In fact, given the box, all the timber needed is about 4ft. of $\frac{3}{4}$ in. by 8in. deal board, with 4 pieces of 1in. by $1\frac{1}{2}$ in. wood, 2ft. 6ins. long, for the legs. Angle bracket can be readily cut from scrap. Not an expensive set-out, but if well made, quite equal to a commercial article costing four times the money.

For the box, choose a good quality one, as near as possible to the dimensions given in Fig. 1. In fact, these dimensions were taken from such a box (one of the kind used to export fruit to this country), used to make the original article.

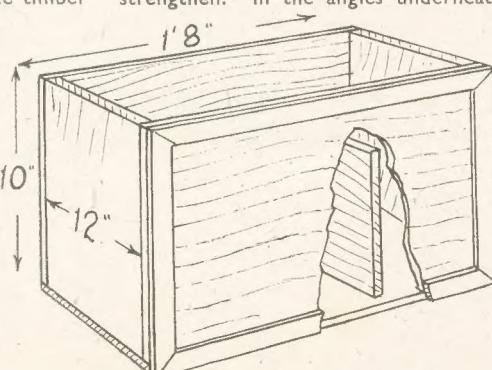


Fig. 1—Cut-away view showing box construction

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Boxes vary, as readers know full well, and one with smooth sides should be chosen if possible, as much labour of glass-papering will be saved. Place the lid aside, as this can be used to make the interior division seen in the diagram. If considered necessary, strengthen the box, especially the bottom, with a few extra nails, and in any case drive all nails well home, as no nail heads are wanted sticking up.

Division Piece

The division piece can now be nailed across. It is suggested here to place the division so that one compartment is about double the size of the other, the larger one being reserved for potatoes, the vegetable probably most in demand in most households. That however, is a matter for personal choice.

If a length of blind lath is available or can be bought locally cheaply, an improvement to the front of the box can be easily effected by gluing and pinning it round to cover nail heads and box bottom, and thicken the top. This addition is shown in the diagram. The pieces of lath will look much better if mitred at the corners, giving a panelled effect to the front view.

Leg Pieces

Cut the pieces of wood to be used for the legs accurately to the same length each. It is not imperative to be tied down to the sizes of wood suggested, i.e. 1in. by $1\frac{1}{2}$ ins., as any wood near to these dimensions will serve quite well.

The legs are screwed to the ends of the box, with round-headed brass screws, glue being added to the joints to strengthen. In the angles underneath

the box, at both back and front, it will be helpful to add brackets as shown at A in Fig. 2, to stiffen the structure.

These brackets can be cut to size and shape shown and fitted in with glue and nails or screws. It will be noticed that the shape of these brackets allows them to be fitted in easily, the nails being driven in where indicated in the drawing. If the bottom of the box is of rather thin wood, as sometimes is the case with these boxes, screws would be better than nails for fixing the brackets; they hold better.

If a stouter wood, say 1 $\frac{1}{2}$ in. square is available to use for the legs, then they can be cut away to half thickness where they contact the box ends, as at B, and so fitted, the brackets can be omitted if desired. However, in either case, their inclusion does strengthen the article and rather improves its appearance as well.

The Top

Cut the two pieces of board for the top, to length long enough to overlap the legs by $\frac{3}{4}$ in. The combined width of the two should also allow for the same overlap at back and front. These boards should then be hinged together with 1 $\frac{1}{2}$ in. iron hinges. Fit them on the face side, as in plan view, Fig. 3, and recess the leaves of the hinges flush with the surface. They must not stick up

(Continued foot of page 294)

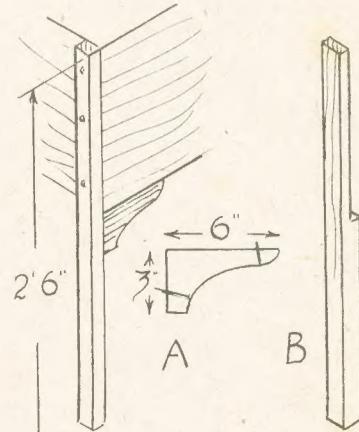


Fig. 2—Detail of leg and corner bracket

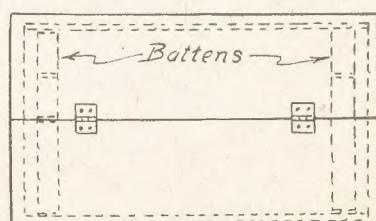


Fig. 3—The lid with adjoining sections dotted

The slot provides a secret in this novelty OWL MONEY BOX

AT first glance of the completed money box it would be taken for just a block of wood with a decorative overlay stuck on the front. But lift it and shake it and one knows immediately that it contains coins. Looking around the box the problem is to find how the coins got there, and where the slot is through which the money is put. Full-size patterns which can be copied or pasted to wood are printed on page 303.

A Movable Head

To solve the problem, look at the circled top diagram in Fig. 1. We see here the head of the owl being raised with finger and thumb and a slot revealed underneath. So the wise old owl evidently will not 'tell' unless he gets his ears lifted! Now this interesting little novelty is very simple to make, and the wood for it should cost but a few pence.

A good idea of the size of the finished article can be got from the full-size outlines of the various parts given on page 303 of this issue. No enlarging of any part is necessary, but the owl overlay needs some imagination in getting the colouring and the detail of eyes, etc., to look realistic. The box is made wholly of $\frac{1}{4}$ in. thick wood, while the overlay consists of $\frac{1}{8}$ in. stuff.

Having, then, some pieces of wood of convenient size for handling, we commence to prick off the pieces direct from the pattern sheet and to connect up these points with the pencil. The base (A), the front and back (B), and the top (H) can be done thus and cut round with the fretsaw. Only one of the pieces (B) will have the two slots cut in it, the back section of the box being, of course, a plain oblong.

A disc will be cut from piece (A), which is the base of the box, for the removal of the money. The centre is indicated on the diagram from which the circle can be described on the wood direct.

Wedge Disc

When cutting round the disc hold the fretsaw a slight angle so that the piece removed is wedge-shape as it were and

can be returned to its original position without actually falling right through. A piece of stout brown paper should be glued over the whole base of the box, including the returned disc at completion. When it is required to empty the box of its coins, the sharp tip of the blade of an ordinary pocket knife can be inserted in the cut and run the complete circle, thus releasing the disc for removal.

The base (A) of the box should have its three top edges rounded off neatly with file and glass-paper and look like the finished thing in Fig. 1. The two ends of the box measure $4\frac{1}{2}$ ins. by $1\frac{1}{2}$ ins. and they will be glued between the back and the front. Fig. 2 shows this and also the general construction of the box.

Bird Shape

The box can be completed with the exception of putting on the top which must be held over until the movable part has been put in place. The overlay (D) is next cut and the pattern for this is given and must be pasted down to the wood or traced off and transferred by carbon paper. Note how the head, etc., is cut through and must meet accurately after the body portion is glued to the box.

The square opening in the head is to take the piece (G) which must be securely glued in. The end grain of piece (G) is covered by the piece (E) later, when the head position is tested. The back piece (F) is accurately cut from the $\frac{1}{8}$ in. stuff and glued on, as the

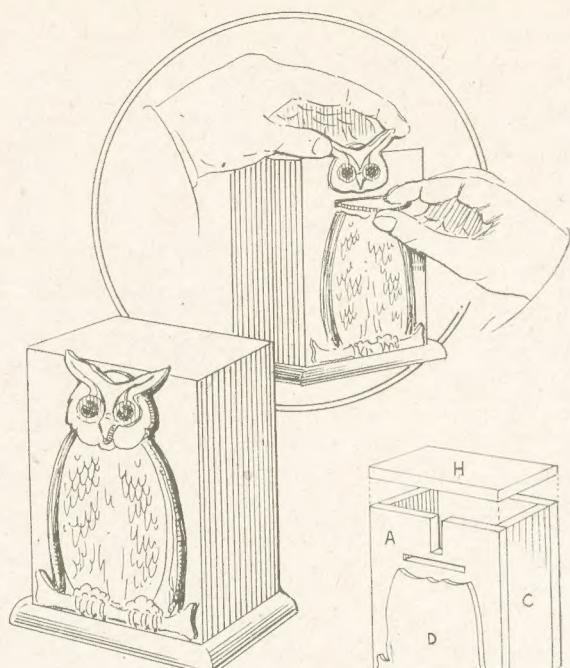
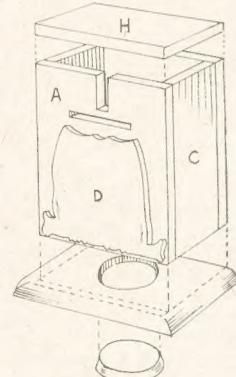


Fig. 1—The box and its money slot



enlarged detail Fig. 3 shows.

Fig. 2—General details of construction

When the glue has hardened on all these parts the whole thing may be dropped into place in the slot in the front of the box and the top (H) finally fixed on. All three parts (E), (F) and (G) should slide up and down stiffly in the slot. Should (G) run too freely so that movement is visible on the slightest movement of the box, then a thin washer should be inserted between (F) and the inside of the box.

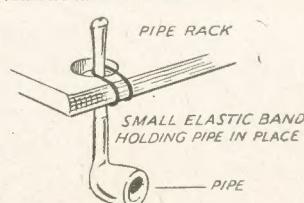
The box should be cleaned with fine glasspaper and painted in bright green with the front of the box black, so the owl shows up well. The bird is appropriately painted in browns of suitable tones. The eyes should be dark brown or they would look well if suitable beads could be got and glued in.

The dotted lines on the body overlay at (D) on the pattern sheet should be deeply scratched in the wood to look exactly as if it were cut to match the cut line in the neck. The moving part of the head would then not be so apparent.

Pipe Hanger

HERE is a useful device for a single shelf pipe rack, which abolishes the inconvenience of the bowl having to be at the top of the hole with the stem hanging. The nicotine thus drains into the mouth-piece causing an unpleasant taste. A rubber band is looped over the pipe and the pipe pushed through the hole, stem upwards. When the band is brought under the rack to the side and

again looped over the stem, the pipe will be held bowl downwards and no unpleasant taste will occur.



Details about bait that attract fish are given in these ANGLING NOTES

CHOICE of bait is a vital matter when fishing during summer holiday time. At this period, when weeds are flourishing, the fish are usually well supplied for food from Nature's own larder. Consequently, they must be tempted to take your baited hook by putting something on it that they will find to their liking.

'Bait the hook well, and the fish will bite' wrote Shakespeare, and there is some truth in it. Not always, of course, will they prove obliging, no matter how tempting is your offering. But knowing the best baits to use helps a lot.

Therefore let us glance, briefly, over the list of baits likely to prove attractive to such fishes as the beginner on river, lake, canal or drain seeks to catch in late summer—August and September.

Worms

Worms are always a good stand-by—few fish refuse a worm. For the bigger fish the most useful is the lobworm. Barbel, carp, tench, grandfather roach, and others, even the kingly salmon, like a succulent lob, especially after a good rainfall has coloured the stream and drainage water has carried a few worms into the river to whet their appetites.

You can catch lobworms at night on the grass of your lawn (when the wriggly creatures come up out of the soil) or digging deep into a moist strip of garden will probably turn up as many as you need for a day's fishing.

Red worms, brandlings and cockspurs are also attractive to such fish as trout, perch, chub, dace, bream, roach and gudgeon. Such worms are found in manure heaps and piles of decayed garden rubbish. These baits should be caught up in advance and put in a suitable receptacle—such as an old flower-pot of useful size—filled with clean moss, damped. Leave them there for a week or so, and they will toughen and so last longer on the hook.

Silk Weed Useful

In summer some baits are particularly useful. One that will attract roach is the silky weed found adhering to the steps and timbers of weirs and such-like places. It is a simple matter to collect a quantity and keep it in a tin containing river water. Cover the hook with the

weed and swim it down the runs and shallow streams below a weir.

In summer, too, chub will often take such baits as cherries, (take out the stone and insert a hook in its place, squeezing up the cherry again on to the hook). Other fruits as damsons may also be tried.

Natural Flies

Do not overlook the value of natural flies and other insects for hot weather fishing. Bluebottles, woodflies, cowdung flies, fern-web beetles, grasshoppers, bees, larvae and caterpillars are all used with success in summer, for trout, chub, roach, dace, etc.

Such baits are carefully impaled on the hook and 'dapped' on the surface of the stream. Needless to say, it is

In late summer, withy-bobs (large speckled caterpillars found on waterside trees) are excellent for catching chub.

Artificial Flies

In sun-bright weather, chub, roach, dace and rudd can all be caught on small artificial flies.

Chub and dace are the main quarry of the dry-fly angler whose objective is to take advantage of days when such 'coarse' fish are rising to surface food. The usual fly-rod and tackle as used for trout and grayling is the best rig-out, but it is possible to manage with any good supple rod. A dressed silk line and gut-casts tapered from 1x to 3x, 2yds. or 3yds. in length, are the needful requisites.

The line should be greased with Mucilin or Cerolene applied with a bit of wash-leather. It is also as well to grease the gut-cast nearly to the fly—both line and cast should float well. The fly itself is anointed with liquid Mucilin (or you can make do with a spot of grease) to keep the lure on top of the water.

Flies recommended include Wickham, Tups, Black Gnat, Alder, Coachman, Olive Quill, and Black Palmer, on smallish hooks.

Early and Late

In very warm weather during August or September you should fish early and late in the day; an all-night session in such conditions may prove fruitful. For tench and carp especially, at sun-up and after sun-down the angler will do better than in the noontide hours. Bait with wasp grubs or honey paste.

In the daytime, all kinds of fish love the shade of weeds in sun-bright weather and it is a good plan to fish as close to weed patches as advisable. You have to risk a big fish, after hooking, trying his best to get into the weed jungle, but with skill you may work him clear by hand-lining him, if he does succeed in boring into the entanglements.

One more bait worthy of mention and which was used before the war is creed wheat. Anglers using it put a quantity of wheat in a pan and let it simmer until the grains crack open.

Do not leave any live baits, such as maggots, grubs, worms, etc., exposed to the sun—it does not agree with them!

Vegetable Box—(Continued from page 292)

above it as they will inevitably catch against something when articles are moved on the table top, or the top is wiped down.

Underneath the top, battens of $\frac{3}{8}$ in. by $1\frac{1}{2}$ in. wood are screwed to prevent warping. The position of these is shown by dotted lines, and it is rather important to fit them accurately as they help to keep the top steady and prevent it sliding about. The battens

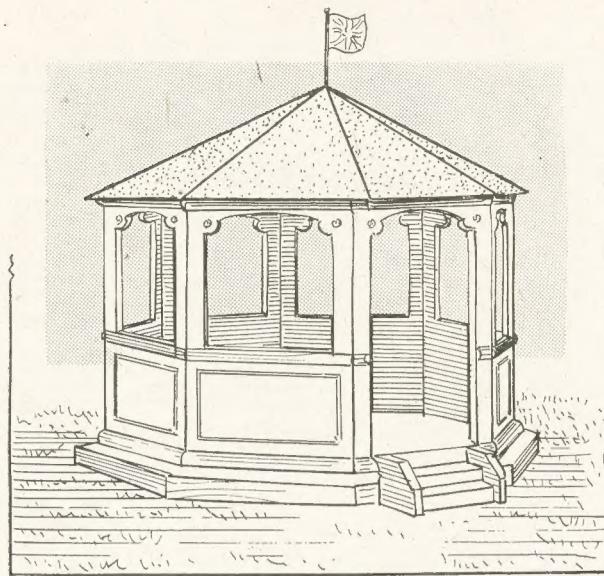
are, of course, divided where the hinges come, to allow the front half of the top to be lifted up as a lid, to allow access to the vegetables inside.

It is not proposed to fix the back half of the lid on but rather to allow it to rest on the box, as this will permit of the whole top being lifted off for cleaning out the interior at intervals. If, however, it proves awkward to shift the article without the lid coming off,

then a small cheap pattern of cupboard bolt could be fitted to the battens each side, where indicated by the dotted cross lines, and be shot home in holes bored in the ends of the box.

The whole article should be painted. White is suggested, to look smart and clean, otherwise the plain wood soon soils, and scrubbing down becomes necessary at rather frequent intervals. Clean, of course, before painting.

A reminder of the seaside holiday is this MODEL BANDSTAND



THIS is an attractive and rather unusual model, well worth making as a change from the popular ships and buildings. There is nothing difficult about it, but some care is necessary over jointing the sides if the result is to look well, also a lot depends on the finish.

What we may describe as the carcase consists of two octagonal pieces of fretwood, joined by 8 side pieces. The octagonal shapes are shown at Fig. 1. These are set out and cut from $\frac{1}{4}$ in. fretwood.

The shape is quite easy to draw, first set out a square to the outside dimensions, then with compass and radius from corner to centre, strike the quarter circle, as shown. Repeat this at the other three corners, and where the arcs cut the sides run lines across to form the octagon. Cut these shapes out accurately and both alike.

Side Frames

Of the 8 sides, cut 7 to size A, and 1 to size B. Note here, the only difference between A and B is in the window opening, which in the latter extends to $\frac{1}{4}$ in. above the bottom to form a doorway. Before cutting out the openings, it will be advisable to bevel the side edges for the parts to fit together round the octagon top and bottom pieces.

The correct angle of bevel is $67\frac{1}{2}$ degs. and a simple gadget, as at C, in Fig. 4, can be made to simplify the business. This is drawn out on a piece of thin paper, gummed down to tin and cut out. It need not exceed 1 in. square. The flange at the bottom is cut across the middle, and one half bent upwards and the other half bent downwards.

Remove the paper from the tin by soaking in warm water. Place it on the end edges of each side and mark the angle of bevel with pencil lines. It will be seen that the width of these sides is rather full, to allow of slight difference in width across the face edges of the octagons. Fit each part in turn, securing it temporarily with a single nail at top and bottom.

Then remove and number them to ensure their replacement to the particular side edges they have been fitted to. Now mark out and saw the window and door openings; which done, fit the sides back again, this time with glue and some additional nails as well. The diagrams D, Fig. 2, shows one of the sides in position to help explain the above.

The base of the model is another octagon, cut this time to the dimensions

given in Fig. 3. It can be cut from deal or other wood, (no need to waste fretwood over this part) planed to $\frac{1}{4}$ in. thickness. A small piece is cut out of one side as shown, in which the steps are to be fitted later.

Assembly

Now glue the carcase exactly in the centre of the base and when the glue is set hard, further secure with a couple of screws from underneath, well countersunk.

From the waste of the $\frac{1}{4}$ in. fretwood, prepare some strips of quarter round moulding and mitre these round each side at top and bottom, as shown in the section E, Fig. 2, at A and B. These should be neatly joined at the angles and here the gadget C, will again come in useful. Level with the window openings, mitre round some half round strips, also cut from the scrap $\frac{1}{4}$ in. fretwood. These are shown at C, in Fig. 2. The mouldings are cut short of the doorway, naturally.

The Steps

For the steps, cut 2 to the dimensions given in the inset, Fig. 3, from $\frac{3}{16}$ in. wood. The steps are cut from $\frac{1}{4}$ in. wood, one measuring $\frac{1}{2}$ in. by $\frac{1}{4}$ in. and the other $\frac{1}{4}$ in. square. They are glued together and then to the side pieces, the whole being then fixed in the cut-out of the base, opposite the doorway. The drawing of the completed model shows this detail quite clearly.

(Continued on page 296)

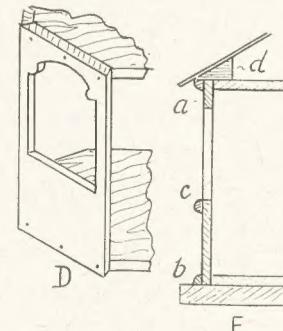


Fig. 2—Fixing the sides

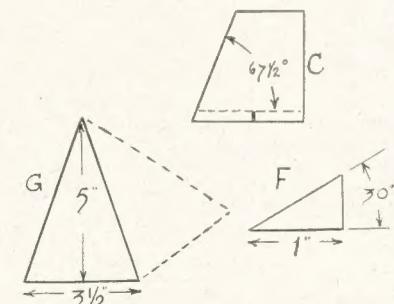


Fig. 4—Parts of the card roof

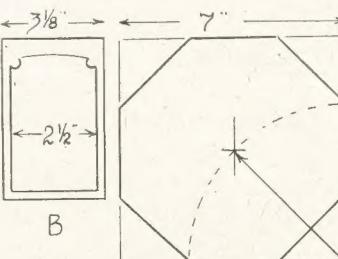


Fig. 1—The floor and side panels

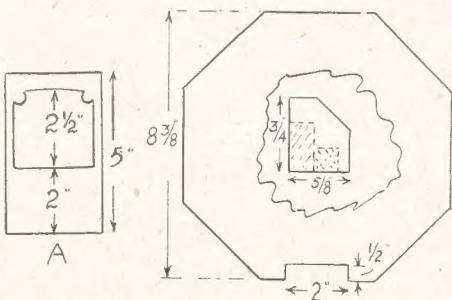


Fig. 3—The base and steps side

More gadgets and suggestions for practical HOME IMPROVEMENTS

WHEN we expect guests we just do not know where to put those extra coats without weighing the existing hall stand down.

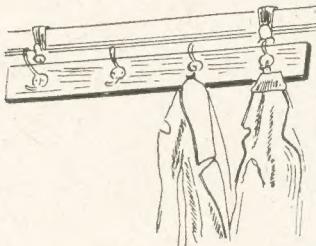


Fig. 1—A temporary hall coat hanger

Why not have a simple mobile one which you can bring out for the occasion?

This one (as seen in Fig. 1) saves you knocking holes in the wall and can be left up and taken down when desired. Choose a good piece of board about 1in. thick, 3ft. long and 6ins. wide. Try to get something a little attractive in case you leave it up. Smooth it well down, especially the edges. If you like you can bead it round with the corners mitred.

Next, fix on your coat hangers, spaced out evenly and not too close. Greatcoats take quite a space. Four will be ample for this length. Fit two fairly large screw hooks in at the top about 4ins. from each end. You can then hang this on the picture rail with two of the ordinary picture hooks.

Window Insect Frame

Many, especially during the summer months like to sleep with the bedroom window open, but this does sometimes mean all sorts of creatures flying or crawling in with the possibility of a stray cat as well. Even on a foggy night the air is not so good. What can we do to remedy this situation? The answer is to make a frame filter, as shown in Fig. 2.

Make the frame from 1in. wood to fit squarely and firmly to the space which you mostly have open. Secure some good quality butter muslin and add this to the frame with double thickness spacing drawing pins round after you have stretched it tight. Drawing pins are best as you can then take the material off for washing purposes. The frame is

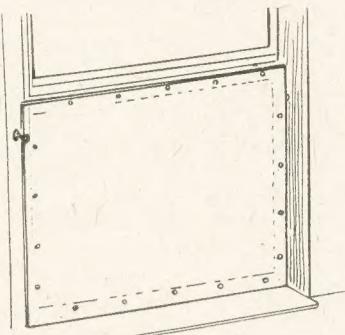


Fig. 2—A fly window trap for summer

held in place by the hooks and eyes, as shown in the illustration.

A Bathroom Seat

An old kitchen chair which has become somewhat on the wobbly side can be saved to make a useful seat and cupboard for the bathroom and altered, as you see in Fig. 3. Remove the existing seat section which will leave the back and the two front legs with rails. Cut a piece of plywood to fit the base of the two back and two front legs. Screw this on to make it firm. Bead round inside the legs with some 1in. square wood so that you will have something to nail on when fitting the sides. You cannot fix the sides to the edge of the plywood satisfactorily.

You will now be able to cover in back, front and two sides with composition boards to have a square box with floor

whilst the back of the chair still in its original position. Square up inside with 1in. quartering again to give strength. If you can get a thicker board for the top, then this will be better. Make this into a seat to hinge on the strut across base of back. You can get special cork to fit this and then paint in white or to suit your colour scheme.

Bathroom Improvements

We cannot all have tiled bathrooms and there are times when that part just above the bath gets very dirty. Provided it is not painted, you can make a panel of tile linoleum go along there and finish the edges off with a neat beading. Lino should fix on with lino paste if the wall is distempered. Paint is too glossy and the paste will not hold. Even so, you could mount the linoleum on some

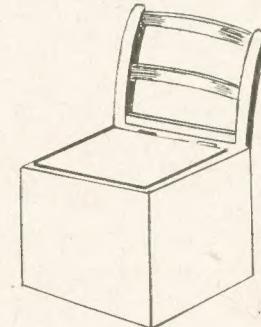


Fig. 3—Bathroom seat and cabinet

composition board which is now plentiful and really quite cheap to purchase.

Steam in the bathroom is another great problem and the mirror will get steamed up and dampness form on the walls. This is mostly when the water is running in. Open the window while the bath is filling and add a length of rubber tubing to the geyser tap or hot water tap. See that the tube is under the water.

(174)

Bandstand (Continued from page 295)

The roof is made from cardboard, that to be got from a shoe box is quite thick enough for this part. Draw pattern G, Fig. 4, on stiff paper and cut out. Place on the cardboard and pencil round it, replace pattern against one side of the pencilled shape and mark round again as shown by the dotted lines, and repeat this until 8 shapes, joined together, are so marked. Draw a knife on the divisional lines lightly across, then bend the whole to the octagonal shape of the roof. Join the ends together with a strip of paper, gummed over.

From scrap bits of the fretwood cut 8 of part F, and glue them to the top of the bandstand, one touching the edge of each face of the octagon, as seen at

D, in Fig. 2. Before fitting the roof on, drill a hole in the centre of the top just a tight fit for a piece of stiff wire, which forms the flag staff. Push a piece of the wire through the centre of the roof also from the inside.

Cut the wire to a length of 4ins. and push in the hole in the top of the bandstand. Apply a little glue to the outer edges of parts F, then fit the roof on, the wire going through the central hole and sticking up above. Press the roof down to help it adhere firmly. This completes the work of construction.

The bandstand can now be painted to choice. White might be a suitable colour to employ, with green for the base and red for the roof, the panels being put in with a fine brush.

This is only a suggestion, as no rules exist as to colour of bandstands and the reader can happily please himself.

The roof, instead of paint, could well be covered with a suitably coloured paper, red, as suggested, or perhaps grey, to imitate lead or slate. If deciding to paper over instead of painting over the roof, set about the job correctly to get a satisfactory result.

First paste over the angles a 1in. wide strip of the paper, then cut 8 pieces of the paper to the size of the pattern G, and paste these over each sloping side of the roof. This will hide the cut lines, (which will break open on bending), and look very neat.

Finish the model by gluing a small flag to the top of the flagstaff.

For Summer Time or Christmas parties make yourself an ICE CREAM FREEZER

ICE cream is again one of those luxuries that can be enjoyed all the year round. It is very acceptable during a spell of hot weather, but it can be equally useful for a Birthday Party or even at Xmas time.

For this reason it is very nice to be able to make your own just when you feel like it, besides which you know exactly what is in it and you are also able to produce many flavours which are unobtainable at the shops.

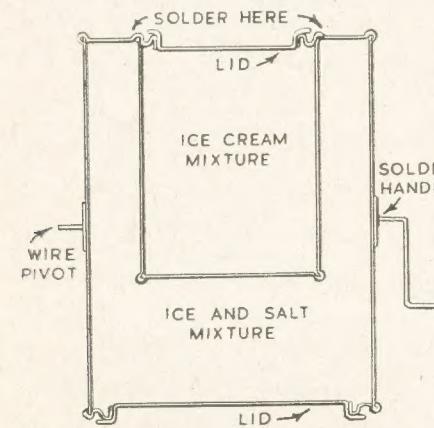
The apparatus needed for the production of ice cream is very simple to make and apart from the time taken need not cost anything. The freezer shown in the drawing consists of two good clean lever top tins, one fitting inside the other. The small tin holds the ice cream mixture, while the other one is for the freezing mixture.

Container Size

It will be seen that the lids are on opposite ends, and it is necessary to see that they fit tightly. The freezer can be made any size to suit your requirements, but the measurements given will produce quite a nice batch of ice cream, and is also a very useful size to experiment with.

The small tin is a 2lb. size treacle tin measuring 3½ ins. diameter and 4½ ins. high. The large outside one is a paint tin about 6ins. diameter and 8ins. high. The small tin should be well washed out and dried to prevent rusting. You need not be so particular, however, with the paint tin, although it is better to have a nice clean one for the job.

The top end of the small tin must be soldered into the bottom of the large outer tin. Carefully clean off the printing from the treacle tin with emery paper to about ¼ in. down from the top rim. Then cut a hole in the paint tin



A section through the containers

bottom so as to make as tight a fit as possible. Run plenty of solder in to make sure that you have a watertight

join all round. If it is not tight and some of the ice and salt mixture leaks out it might find its way into the ice cream tin and spoil the batch.

The turned-over rims of the two tins where the sides are joined to top and bottom are usually made tight, but it would be as well to test these out before soldering up. This may be done by filling with water and standing for a time to see if any oozes out.

You can run a little solder round the joints as a precaution but modern tins are made so well that it should not be necessary.

A Turning Handle

After soldering give the tins a thorough washing in hot soapy water and rinse out and dry well. It is now possible to make ice cream without any further addition to the tins, but it might be an advantage to fit a pivot and handle so the freezer can be slowly revolved in a wooden stand as shown in the drawing.

A stout piece of wire will do nicely for the handle and pivot. It is best to fix into a small metal plate by riveting or soldering and then to solder the plates on to the side of the tin.

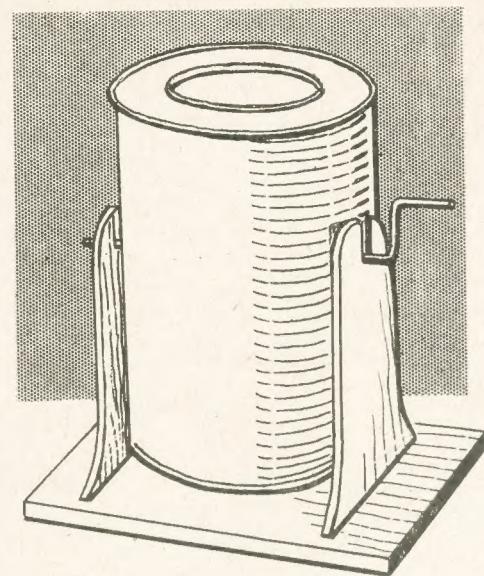
Two strips of wood having slots cut in the tops to take the pivots and fixed to a baseboard complete a handy stand. The complete freezer and stand would be much improved in appearance, besides being cleaner and less liable to rust, if given a coat or two of paint or enamel, allowing plenty of time to dry hard.

How to make Ice Cream

There are heaps of ways of making ice cream and a very interesting time can be spent in experimenting with different mixtures. Ordinary custard powder made a little thinner than usual would do to start with—make sure that you get all the lumps rubbed out before adding to the boiled milk.

Cornflour made with boiled milk and flavoured with fruit essences or real juice can be used to form some very nice ices. The exact amount of the various ingredients can be easily found by a little experimenting. A very little gelatine is sometimes added to certain mixtures to give extra body.

Water ices flavoured with fruit juices and with a small quantity of glucose added make a very pleasant change—it may be necessary to add a little cornflour or gelatine to this mixture to give sufficient body to freeze properly.



Having made the ice cream mixture and placed it in the small tin with the lid securely fixed, the next job is to freeze it. To do this the large outer tin is filled tightly with a mixture made of chopped ice and freezing salt in the proportion of about six or eight parts of ice to one of salt.

Freezing Mixture

The ice is best chopped up to the size of peas and a small quantity put in the freezer, then a layer of salt, some more ice and then salt again, until the container is packed tight. The ice and salt can be obtained from an ice factory if you have one handy, if not, a fish merchant will let you have a small quantity.

Put the lid on securely and place the freezer in the stand and turn the handle slowly. At first you will need to open the small tin occasionally to see how the mixture is progressing. But after a few batches have been made you will be able to judge the time taken fairly accurately and will not need to open up until the freeze is completed.

As Stand Mixer

If you decide to make the freezer without the handle and stand, you fill up both tins just the same and then put the freezer in a cool place. After about, say, five or ten minutes, turn the tin over so the bottom is at the top, and leave in this position for a similar length of time. Then turn back again. You will not need to turn the tins many times before the mixture is frozen correctly.

After the ice cream is made it may be kept quite good in the container for many hours without refilling the ice and salt chamber.

A PHOTOGRAPHIC ALPHABET

I for—

INTENSIFICATION

SOMETIMES by accident a film is taken from the developer too soon and while the image is all there it is weak and of poor printing quality. In such cases it can be improved by a process known as 'intensification'.

There are several methods, but the simplest is the 'chromium'. Here the negative is bleached, thoroughly washed and then redeveloped in the same developer originally used, when the image returns much darker than it was before.

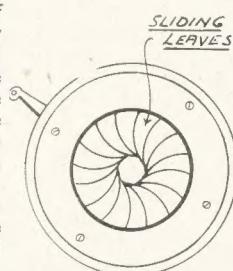
The bleacher can be bought in tabloid form from any photographic dealers and the bleaching solution is made by dissolving one tabloid in 4 or so ounces of water. In chemical form a similar bleacher can be made by dissolving 30 grs. of potassium bichromate in 3ozs. of water, 60 drachms of hydrochloric acid being added after.

A negative to be intensified must be perfectly free from hypo, i.e., have been well washed and the washing between bleaching and developing must also be very complete, the yellow stain left by the bleacher all being removed.

Intensification is only good for under-exposed negatives in certain cases, generally it makes such too hard and turns the final print into a 'soot and whitewash' effort.

IRIS STOP OR DIAPHRAGM

IN less expensive cameras the opening in front of the lens is given by a rotating piece of metal in which various sized holes have been punched. Rather dearer instruments, however, have what is known as an 'iris diaphragm'. This is made up of a number of exceedingly thin metal leaves which lie one on the other. They are connected with a collar in such a way that when a ring in the outside of the lens is turned they all close in and thus make the opening less. The advantage of the iris diaphragm is that a very fine adjustment of stop can be obtained. With the metal plate you must just take a stop of, say, f-8 or f-16, but with the 'iris' any stop between can be obtained. The iris diaphragm is a very neat piece of work and helps lens and stop to be better kept as one compact unit.



J for—

JUDGING DISTANCES

TO be able to do this with a good degree of accuracy is very important when using a camera that is focused by adjusting a pointer on a scale. Reflex cameras and those fitted with range-finders get over the trouble by letting you see the subject as you focus on it and so it is easy to tell when good definition has been obtained. With scale focusing alone, the only way is to judge how far distant is the item being taken.

Pacing is quite a good way of establishing distances, once you know how long one of your paces is. Another way is to get a fair idea of what, say, a 6ft. man or other known length would look like on the ground and then estimate how often it would go into the distance in question.

The great thing is to practise and to be constantly noting how familiar distances look, such as the length of a cricket pitch, or the height of a marked bridge. The H signs in walls which tell you where hydrants are, are also inscribed with a distance, as 10ft., 30ft., etc. Find the hydrant and see if the 10 or 30ft. agree with your idea of such distances.

K for—

KODACHROME

EVEN the beginner at photography can now get colour pictures with his snapshot camera, exactly like those seen at the cinema. The roll bought must be a 'colour film' and the results obtained are a series of coloured pictures which are viewed in the same way that you would look at magic lantern slides.

A typical colour film is Kodachrome produced by Messrs. Kodak Limited. In normal times this can be obtained in the ordinary roll-film sizes, as film packs and also in the 35 mm. width for miniature cameras.

Films of this sort are put through the camera in the usual way, the only point being to choose fairly colourful subjects when taking. The spool must then be given back to the dealer for processing, as development is rather beyond the ordinary amateur.

L for—

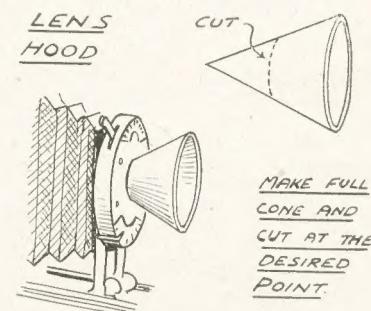
LENS HOOD

FOR a picture to be bright, the only rays to reach the lens should come from the subject. With lenses that

Any amateur photographer should remember these hints to improve his pictures.

stick out rather, stray rays sometimes get on to the surface from the side and give a bit of haziness. This trouble can be entirely stopped by using a lens hood. A hood is quite simple to make, being simply a part cone of blackened card, as shown, which slips in the front of the lens.

Such is the brightening effect of a hood that press photographers always use this accessory. Box cameras do not need them, however, as here the lenses are usually set well inside the front and so are already 'hooded' by the body. They should be used with all folding cameras.



As well as brightening straight snapshots, a lens hood makes it possible to take a photograph with the sun well round to the front, and even with the sun dead in front if the camera is not in any way pointed up. They also help a lot if taking night scenes or interiors having side windows and other lights.

LIGHT TRAPS

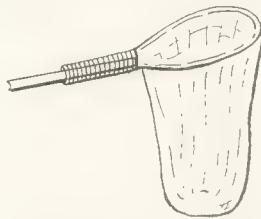
AT the near side of a dark slide, where the cover comes out from the frame, is found a strip of velvet. Such strips are also in film packs and sometimes inside cameras. These are 'light traps' and their purpose is to allow two parts to slide over one another (generally one into the outer air) without light getting in at the same time. The best material for making 'traps' of this kind it has been found is ordinary fine-pile velvet.

In the course of time the pile sometimes gets pressed down, and a certain amount of light can then get past. If you use a plate camera, therefore, and some of the dark slides are letting in light, examine the velvet strips carefully and where necessary make a renewal. If possible, strips should be in one length, but if it is imperative to join two pieces, cut the contacting ends diagonally across the width of the piece as this prevents the danger of light coming in, a danger which is there with a square cut join.

How and what to do if you undertake BUTTERFLY COLLECTING

COLLECTING butterflies is an interesting hobby in summer. A collection of these lovely insects set out in a suitable case or cabinet is a constant joy. When on your summer holidays a few hours spent in the chase of the "winged flowers" of the countryside and the quest of rarer specimens will provide thrilling fun, and give lasting pleasure.

August is a butterfly month. At this period many of the larger species begin to be conspicuous. The beautiful and gorgeously-coloured Peacock is now on the wing; the Red Admiral also appears. Brimstones are abundant, and the numerous Fritillaries of golden-brown hues are common at this time; the



A simple homemade catching net

Comma-looking rather ragged of wing—is found in many districts.

Among others the large Tortoiseshell butterfly is well worth collecting for its glorious colouring—it is a most handsome insect and appears in August. The Painted Lady is generally about when the Michaelmas daisies flower in the country gardens. Then we have the small Tortoiseshell which is abundant from July till October.

More Species

Add to the above species the Meadow Browns, Graylings, the various Heaths, the Small Coppers and Hairstreaks, the Gatekeeper and the different Blues, of which the Common Blue, as its name indicates, is common everywhere in July and August. The Adonis Blue is more familiar with collectors in the south-country, whilst in limestone areas the Chalk-hill Blue attracts the eye by its iridescent colouring.

The various Skippers are also out

Wood Splitting

A HANDY way to prevent a split in a piece of wood from opening or lengthening, is to drive staples over the split. The split can be closed up while stapling with a clamp.

during July and August. Some of these are only found on dry soils and sand-dunes, often just locally. The Large Skipper, however, is abundant all over England, in August.

A Home-made Net

For the benefit of beginners we may list the few needs of the collector. These are simple enough—a net, a killing bottle, and a storage tin. You can buy a suitable net from the entomological dealers (addresses on request), but any handy fellow can easily make one, such as illustrated in Fig. 1, as follows.

Get 1yd. of muslin, the best and strongest you can buy. Fold it into the shape of a long bag, sew the sides and turn in a hem round the open mouth. Do not shape the net to a very fine point, make it more cup-shape and about the length of your arm. Take a piece of stout wire and bend into a ring, but leave two spurs, one at either end of the wire, about 6ins. long.

Run the wire through the hem of the bag, and see that the open mouth is held in the form of a circle by the wire.

A walking stick or a suitable cane can be used as a handle. When the time comes to use the net, place the two wire spurs along the end of the stick and bind tightly with cord (see sketch).

Killing Bottle

The killing bottle is simple. The safest thing to use as a killing agent is pulped or freshly-pounded laurel leaves. A round tin or suitable box will serve, having at one end a mass of pulped laurel leaves, the remaining space being the insects' lethal chamber; the fumes from the bruised leaves soon kill them. The tin or box must be made as nearly air-tight as possible.

For the storage tin any suitable flat tin will do, as long as it is sufficiently commodious, with an inner top and bottom provided with cork or some material as lino that will hold pins. The latter should be proper entomological pins. Ordinary pins thrust through a butterfly are too clumsy. Do not overcrowd the tin with insects.

When you have caught a butterfly in the net instantly grasp the net by the neck, as it were, with your left hand to keep the struggling insect from making its escape. With your right hand gently take hold of it, and give it a sharp pinch between your forefinger and thumb nails, at the spot where wings and body join—under the wings—taking care not to damage the specimen.

Do not try to kill it, just sort of stun it. Then remove it from the net and put it in the killing tin or bottle. Later remove it to the storage box or tin.

Keeping Your Butterflies

Having acquired a number of these lovely insects you will desire to prepare

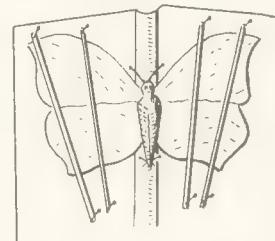
them for the cabinet. First, the specimens will need setting. You can buy setting boards or make them from cork. It is wiser to buy at least one setting board and afterwards make others to that pattern, if you desire to be economical.

Setting and Fixing

It is as well to 'relax' your fresh-killed specimens before setting, by placing them in a storage tin in which the cork has been moistened. Leave for a couple of days. Then take out and fix, one by one, on your setting board. Rest the insect's body in the centre of the groove, and with a long needle smooth out the wings carefully, so you do not damage their fragile texture.

Next, cut some narrow strips of thickish paper and pass them over the insect, two on either side of it, pinning above and below the wings, to the board. See that the insect's antennae are in correct position, and then leave the specimens in a dry place for a week or ten days before finally placing them in the cabinet. The drawing at Fig. 2 illustrates the process.

A proper cabinet with drawers may be too expensive for the beginner making a first start. However, he can



How to set a butterfly

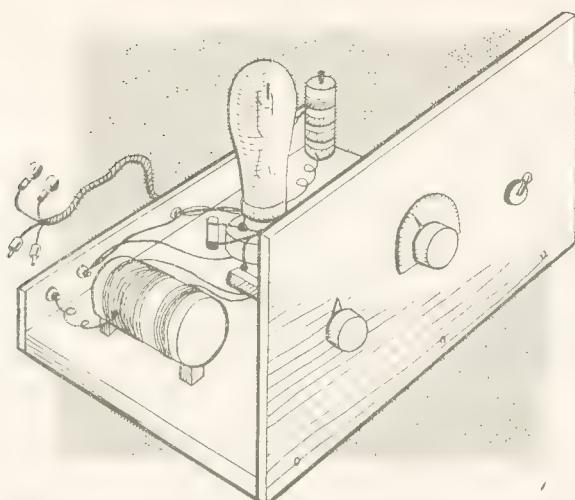
store his specimens in boxes. Get some empty soap boxes from the grocer, size about 10ins. by 14ins. by 4ins. (Or any light deal boxes same size will do). Cut the boxes round the sides and ends to form two equal traylike halves.

Cork Lining

Glue a cardboard shell round the inside of one half, and attach the other half by two small hinges. Each half needs lining on the inside with sheet cork, and then covered with thin white paper. The finished article should neatly fold together, and be practically air-tight. Pin specimens in box and label each suitably.

Sheet cork, pins, and all other necessary tools can be purchased from entomological dealers. Finally, a good book on butterflies will be found most helpful. It is better to buy one, but if you prefer you can obtain one from your public lending library or county library.

For those in suitable areas here is an efficient STRAIGHT I-VALVE SET



Quite a number of readers appear interested in making a 1-valve receiver, and any constructor can follow the design given here with confidence because it is one which gives good results with the minimum of outlay and complication. A one-valve set will give ample headphone volume, even if used with a short indoor aerial and with no earth.

If a good aerial and earth are employed, the range of reception will be proportionately increased. Medium wave reception is best during the evening, and during the hours of darkness no difficulty will be experienced in receiving a number of foreign stations, if desired.

The I-Valve Circuit

The theoretical circuit is shown in Fig. 1, and by comparing this with the practical wiring diagram the constructor should be able to see what each of the symbols represents. A home-wound coil for medium waves is used; the ends being lettered to show how they are connected.

If a ready-made coil is to hand there is no reason why this should not be employed. Similarly, a dual-range coil can be used, either ready-made or home-wound, if long waves are required in addition to medium waves. However, this is a modification which can be made

at a later date without much difficulty, if necessary. The home-wound coil can be just as efficient as a ready-made one, and is of course much cheaper. In addition, many constructors prefer to make this item so as to increase their knowledge of what each component in a radio receiver actually is.

A small 2-volt accumulator is best for low tension, and will give long periods of service as the current consumption of a single valve is

small. For high tension, a 60-volt battery is normally used. A higher voltage will cause fierce oscillation and not give much increase in volume.

On the other hand, good results can be obtained with a much lower voltage and a battery may be made by connecting three or four grid bias batteries in series. Even with regular use, the high tension battery will last anything up to twelve months. Actually, the consumption of a single detector valve is so small the high tension becomes unusable more from age and chemical deterioration, than from exhaustion through the current taken.

The H.F. Choke

As the diagrams show, either a resistor or H.F. choke can be used between detector anode and phones. This component is used to prevent high frequency currents passing as these have to go through the smaller coil winding and reaction condenser.

With some headphones, the windings in the phones themselves will give sufficient choking effect. Where this is so, no resistor or choke is necessary and a lead is taken directly from the anode valve-holder terminal to negative phone terminal.

This method of wiring can be tried first. If ample reaction cannot be obtained, the choke or resistor can then be

added. But two points must be noted—no reaction will be obtained if the reaction coil is wound in the wrong direction, or leads to its ends reversed, and if the voltage of the batteries is not up to normal, reaction will be weak.

A choke can easily be wound as shown in Fig. 2. Cut four washers $\frac{1}{4}$ in. in diameter from $\frac{1}{4}$ in. wood, and drill small holes in the centre of each. Five discs of stout cardboard or thin plywood about 1 in. in diameter are also cut, and the whole fixed on a length of screwed rod, or a long bolt, as shown.

The four spaces thus made should be wound almost full with thin insulated wire. Almost any wire will do, but to get on enough turns for the choke to work properly wire thicker than 36 S.W.G. is not recommended. All turns are in the same direction, and there will be several hundred turns in all. Wind one slot full, pass on to the next, and so on.

The finished choke can be mounted upright on the baseboard by means of the bolt, which can pass down through the base, the nut at the bottom being in a small recess.

Base and Panel

For the base a piece of wood about 6 ins. by 6 ins. and $\frac{1}{2}$ in. thick is used. A 3-ply panel about 5 ins. high is screwed to the front, and a strip of Paxolin, ebonite, or ply fixed at the back to hold four terminals or sockets. The latter strip is about $1\frac{1}{2}$ ins. high.

Any type of on-off switch can be used. Either air-spaced or solid dielectric condensers can be used for tuning, but an air-spaced one is best. There is not much point in using an air-spaced condenser for reaction, though this can be done, if two such condensers are to hand. If only one air-spaced condenser is available, use this for tuning.

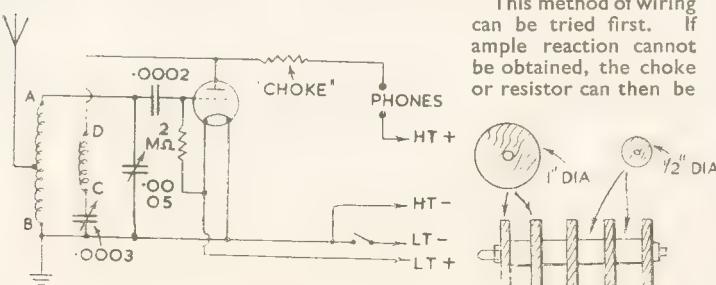


Fig. 1—Theoretical circuit of the set

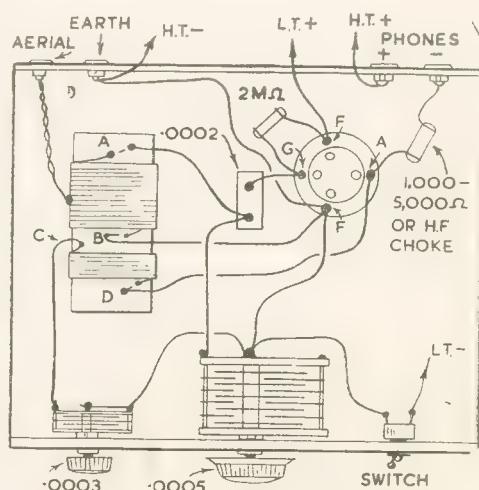


Fig. 2—Complete wiring diagram

If an air-spaced condenser is used for reaction, assure the moving and fixed plates do not touch with the control knob in any position. If the plates touch, a short circuit will be formed through phones and H.T. battery and the former may be damaged. This is why solid-dielectric condensers are usual for reaction purposes, in addition to their being cheaper than the air-spaced type. If to hand, a capacity of .0005 is equally suitable for reaction.

Wiring Up

If all the leads are put on exactly as illustrated in Fig. 2, no difficulty should arise. For battery leads, lengths of flex are used. These can be twisted together and taken through a single hole in the centre of the rear terminal strip. Take great care that the L.T. positive lead is never connected to the H.T. battery, or the valve may be damaged. If this point is observed, a valve will normally give many years of useful service.

If a coil with terminals is used, take leads to these. If a coil is to be wound as will be described, the ends may be left long enough to reach to the various parts in the set, thus simplifying wiring-up. Any type of insulated connecting wire can be used for all the leads.

Tuning Coil Winding

Fig. 2 also shows how the tuning coil is made. It is wound on an insulated tube which is fixed to the baseboard on two

small wooden blocks. The tube can be bought, or made from glued brown paper or thin cardboard. If the latter, allow to dry thoroughly, then varnish, to improve insulation.

All turns are wound on in the same direction, and the ends of the windings are anchored by being passed through pairs of small holes drilled in the tube. About $\frac{1}{16}$ in. space is left between the two windings.

The winding between (A) and (B) is the grid coil, or tuned winding, and that between (C) and (D) the reaction winding. An aerial tapping is made at approximately the centre turn of the grid winding, as shown.

As the number of turns depends upon the diameter of the tube, and other factors, and the constructor may have a tube or wire it is desired to use, the number of grid turns for various S.W.G. and former sizes are as follows:

Diameter of Former. Wire No of Turns

1 $\frac{1}{2}$ ins.	32 enam.	84
1 $\frac{1}{2}$ ins.	32 enam.	66
1 $\frac{1}{2}$ ins.	28 D.C.C.	94
1 $\frac{1}{2}$ ins.	28 enam.	60
2 ins.	28 enam.	50
2 $\frac{1}{2}$ ins.	26 D.C.C.	70
2 $\frac{1}{2}$ ins.	24 D.C.C.	58

This is for the usual medium wave band of 200 to 550 metres. When using D.C.C. (Double Cotton Covered) wire more turns are necessary, as shown, than

with enamel covered wire. For the reaction winding; in each case, put on two-thirds the number of turns which are used on the grid winding. Actually, the number of turns on either winding is not critical, though variations from the figures given will alter the wavelengths which can be tuned.

Some household commodities are packed in containers formed from a cardboard cylinder with metal ends, and this is suitable for a coil former.

Using the Set

Almost any valve in reasonable condition will function, but for best results a detector type valve is necessary. The Osram HL2, Mullard PM2HL, and any of its equivalents produced by other manufacturers, is a good type.

Reaction should be used to build up the volume of weak stations, especially if a short indoor aerial is used. With a long aerial, tuning will be less selective. This can be overcome by reducing the length of the aerial, or connecting a small condenser in series with the aerial terminal of the set.

A similar effect can be obtained by connecting a few inches of insulated wire to the aerial terminal and twisting the lead-in of the aerial round this, assuring there is no actual metallic contact between the wires. Any ordinary medium or high impedance headphones are suitable.

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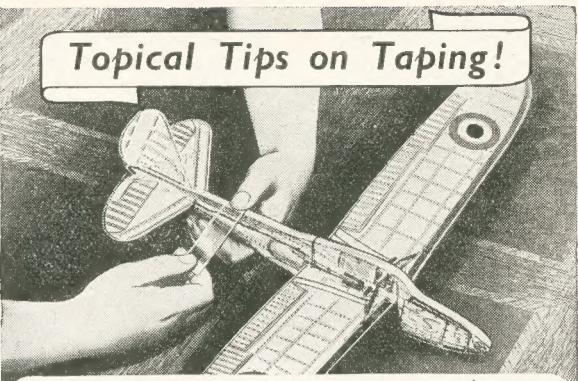


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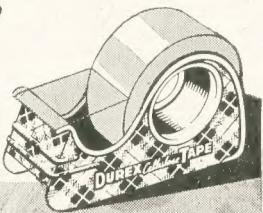
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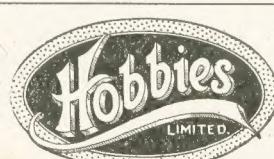
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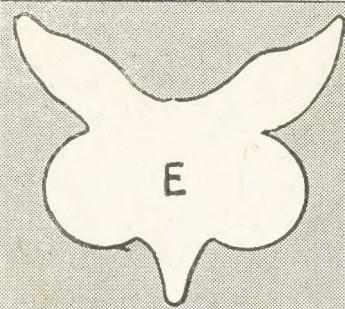
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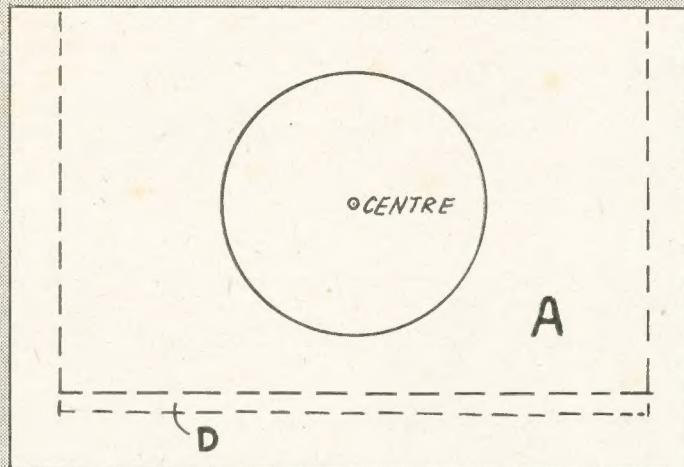


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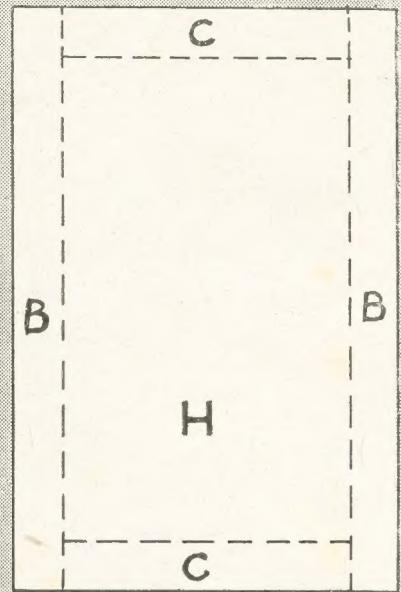


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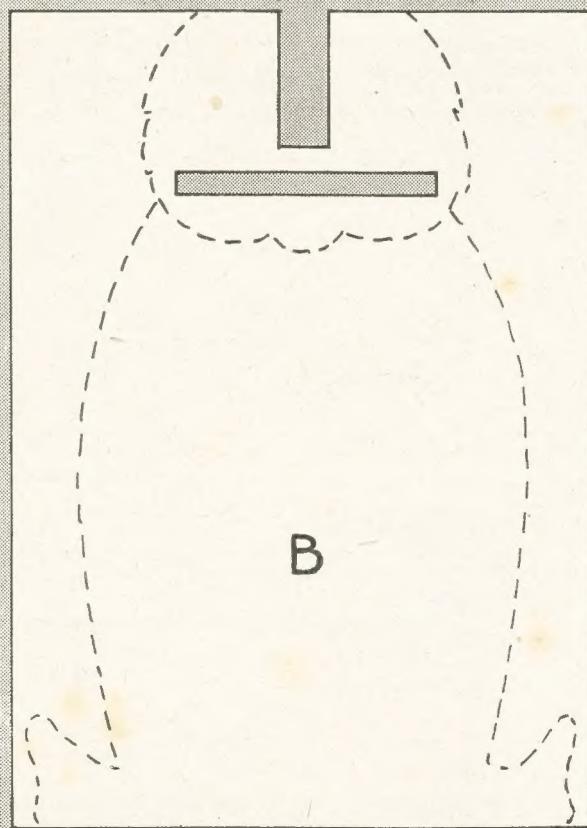
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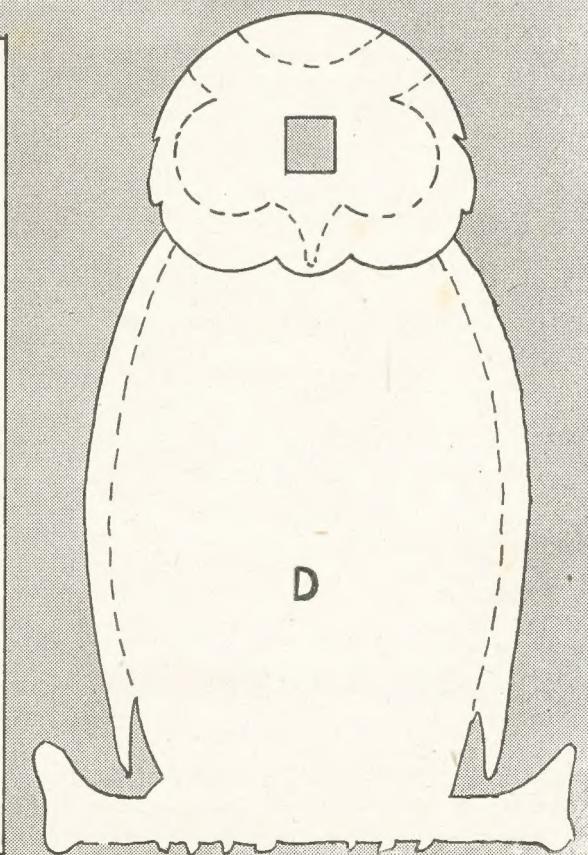
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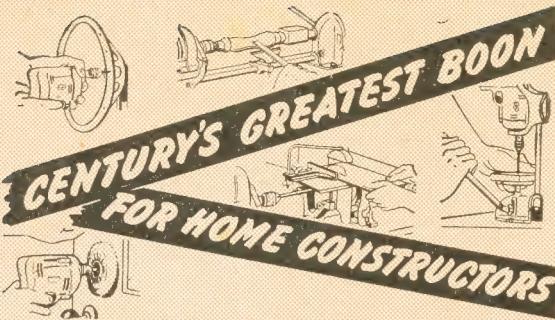
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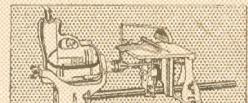
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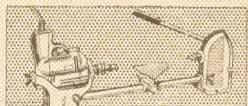
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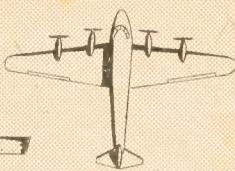
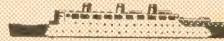
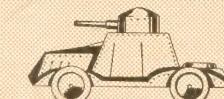
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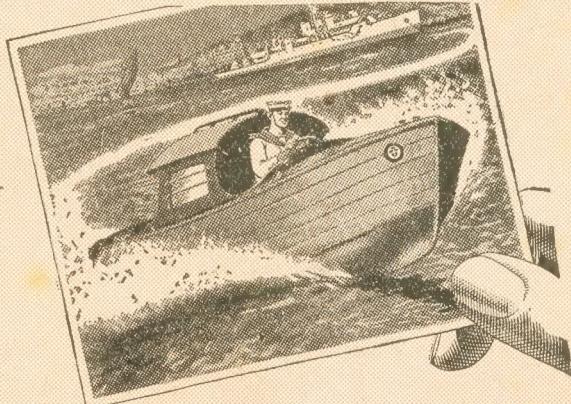
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